PERANCANGAN PENGENDALIAN KECEPATAN MOTOR INDUKSI TIGA FASA DENGAN PENDEKATAN MODEL *HARRIOT* MENGGUNAKAN PENGENDALI *HYBRID FUZZY-PID*

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ABSTRAK

Di industri penggunaan motor induksi sangat diperlukan. kinerja motor induksi berupa kecepatan putar sangat membantu dalam proses operasional perusahaan. Setelah dilakukan pengendalian sistem menggunakan kendali *fuzzy*. Pengendali *fuzzy* memiliki sifat yang kokoh dan respon yang cepat tetapi pengendali *fuzzy* memiliki kelemahan berupa *overshoot* dan osilasi sistem. Salah satu pengendali yang mampu mengatasi kelemahan *overshoot* dan osilasi sistem dari pengendali *fuzzy* adalah pengendali PID. Berdasarkan hasil simulasi dari pengendali *hybrid fuzzy* dan PID mampu menutupi kelemahan dari pengendali *fuzzy* dan kokoh dalam mengatasi gangguan. Terbukti dengan analisa *time respons* yang lebih baik dari pengendali *fuzzy* berupa *settling time* 4,1355 detik, *rise time* 1,8113 detik, *delay time* 2,0512 detik dan *error steady state* sebesar 0,0013 Rpm tanpa *overshoot* dan osilasi sistem. Serta kokoh terhadap gangguan dengan nilai *overshoot* sebesar 66 Rpm (6,6%) pada detik ke 15 dan kembali teredam pada detik ke 17.

Kata kunci : *Fuzzy*, *Hybrid Fuzzy-PID*, Model Harriot, Motor Induksi Tiga Fasa

DESIGN OF THREE PHASA INDUCTION MOTORS SPEED CONTROL DESIGN WITH HARRIOT MODEL APPROACH USING HYBRID FUZZY-PID CONTROL

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ABSTRACT

In industrial use induction motor is necessary. The performance of induction motor in the form of rotational speed is very helpful in the company's operational process. After controlled using fuzzy controller, Fuzzy controllers have robust properties and fast response but fuzzy controllers have weaknesses in the form of overshoot and system oscillation. One of the controllers that is able to overcome the weakness of overshoot and the system oscillation of the fuzzy controller is the PID controller. Based on simulation results from fuzzy hybrid controller and PID able to cover the weakness of fuzzy and sturdy controller in overcoming the interference. Proven with better response time analysis of fuzzy controller in the form of settling time 4,1355 second, rise time 1,8113 second, delay time 2,0512 second and error steady state equal to 0,0013 Rpm without overshoot and oscillation system And sturdy against the interference with the value of overshoot of 66 Rpm (6,6%) at 15 seconds and back muffled at 17 seconds.

Keywords *: Fuzzy, Fuzzy-PID Hybrid, Harriot Model, Three-phase Induction Motor*